Jie Zhou

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EDUCATION

Beijing University of Chemical Technology (BUCT, 211) *2019.09-2023.06*
Major: Mechanical Design, Manufacturing and Automation
- GPA: 3.72/4.33 (Ranking: 1/153, 0.65%)

Harbin Institute of Technology, Shenzhen (HITSZ, 985, C9) *2023.09-Present*
Major: Mechanical Engineering (Robotics), MPhil

AWARDS AND SCHOLARSHIP

- National Scholarship ×2 (top 0.2% in China) (2021, 2022)
- Outstanding graduate of Beijing, Beijing (2023)
- National Competition Awards ×3, China (2020-2023)
- Beijing Competition Awards ×2, Beijing (2021-2022)
- Li Wen and Yang Yan Scholarship, Social Fund (2020)
- Outstanding Competition Scholarship, BUCT (2023)
- Excellent Student ×2, BUCT (2020, 2021)
- First-class Scholarship, HITSZ (2024)

PUBLICATION

Jie Zhou, Yuan Fang, Yang Chen, Yao Li and Bing L, Modeling of the constant-current stimuli response of a bio-robot for long-term motion control. (unreview)

RESERARCH EXPERIENCE

In HITSZ

Modeling of the constant-current stimuli response of a bio-robot for long-term motion control *Researcher leader 2024.1 - Present*

- This study focused on the two major obstacles in the current development of cockroach robot: habituation and lack of basic model.
- ***Artcle main work***: two new methods, one new model.
  - Method1: A new surgical method, optic lobe implantation was proposed. It lasted longer 5 times than traditional methods;
  - Method2: A more effective stiumli signal, bidirectional constant-current sign was implemented. My excellent hardware design skills secured the design of constant-current backpack.
  - New Model: stimulated-motion response is the basic movement process of cockroach bio-robots, but it hasn't been quantitatively described by anyone. I modelled it by machine learning approach in conjunction with theoretical extrapolation and validation.
- Hosting all the works, including idea, surgery, hareware,experiments, program and article.

- **Research on autonomous navigation technology of micro pipeline biological motion control** *Key Technologies R & D Program of Shenzhen.* *Project leader 2023.3- 2024.6*
- Aimed to develop a robot for pipeline maintenance that enables navigation, localisation and image retrieval.
- A electronic backpack hardware was designed, which consisted of uwb position module, camera module, wi-fi module, DAC module and voltage conversion module with stm32.
- Uwb and imu fusion positioning ensuring positioning error not more than 10cm.

- A yolov3-based image recognition algorithm was developed to pipeline identification and steering. Images were transmited by ov5640 camera and displayed in the host software written by qt.
- Hosting all the things mentoned above.

Multi-dimensional force sensor based on origami structure ***Researcher core number 2022.11 -2023.5***

- Aimed to create a new lightweight, high-precision sensor, inspired by Origami Configurations.
- 3-DOF Yoshimura Origami Unit Static model was derived to determine the relationship between unitary forces and postures.
- An equivalent circuit is designed and its resonant frequency is obtained by simulation verification. The equivalent inductance is calculated from the resonant frequency.
- Measurement board used stm32 as the main control and LDC1614 as the resonant frequency measurement chip. Then in turn calculates the angle of pinch and the force.
- Responsible for the design of circuits and physical fabrication.

In BUCT

Roll dung beetle - a biomimetic robot with multiple motion modes ***Project leader 2021.9-2022.5***

- Aimed to develop a bionic robot for exploration and rescue incomplex terrain, inspired by dung beetle.
- The robot has two motion mode: crawlling and rolling forward. Its crawling mechanism based on the Crane linkage. The rolling mechanism consists of two semi-circular supports and the switching between rolling and walking is achieved through a screw nut。
- Done alone all technical content. What I'm most proud is that robot only cost 312.6RMB (HK$338.3).
- **Achievement: China Student Mechanical Innovation Design Competition, 2nd prize in Beijing.**

Ros-based quadruped robot ***Project core mumber 2020.6-2021.9***

- **Background**: 2020 it was the time that quadrupedal robots springed up in China, we dreamed of making our own quadrupedal robot as undergraduates.
- The mechanical design referenced and improved upon Stanford's Puppy. Compared to Puppy, our joint motors are embedded to the inner body, enhancing robot robustness.
- Rivz simulation and kinematic inverse solutions are used for trot gait planning. Jetson nano equipped with ros was chosen as control-center. Laser radar built environmental maps with cartographer.
- **Achievement:** ***National Training Program of Innovation and Entrepreneurship, China, 2021; The 8th national "Internet+"Innovation and Entrepreneurship Competition, 2nd prize in Beijing.***

National Award Mathematical Modeling Essay ***All served as research leader***

- **An investigation of base station planning problem based on clustering-genetical agorithm.**
  - Achievement: *The 12th MathorCup Mathematical Modeling Challenge, 2nd prize in China,2022 .*
- **Reinforcement Learning with Control Variables Evaluation Algorithm in Canine Sheep game.**
  - Achievement*: Shenzhen Cup National Mathematical Modeling Competition, China (rank16),2021.*

Skills

- **Programming**: C++, Python, Qt, Vb, WeChat small-program development
- **Modeling**: MATLAB, Solidworks, Altium Designer, AutoCAD.
- **OS**: Linux, Ros.
- **strong body**: Won one soccer championship and made it out of the group stage in basketball 2 times.
- **Self-awareness**: I consider myself an outstanding mechanical and embedded hardware engineer, a decent programmer. I do believe that I'm also a good researcher. Thank you for seeing here !